

Development of neoaortic pseudoaneurysm after arterial switch operation



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We report a case of a 46-day-old boy who was diagnosed with transposition of the great arteries and underwent arterial switch operation. A large neoaortic pseudoaneurysm was diagnosed on the first postoperative follow up. Successful repair of the aneurysm was done and at the 3-year follow up, the child's clinical and imaging findings remain normal.

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Keywords: Arterial switch, Case report, Pseudoaneurysm

Introduction

Simple transposition of the great arteries is treated with arterial switch operation in the early neonatal period with expected excellent outcomes. In the early postoperative period, the most feared complication is myocardial dysfunction due to coronary ischemia. However, the development of early neoaortic pseudoaneurysm is an unusual complication [1].

Case report

A 46-day-old boy was referred to our center with the diagnosis of simple transposition of the great

arteries. He had a complicated course at the referring hospital with mechanical ventilation and blood stream sepsis including fungal infection. Efforts were made to optimize his condition including balloon atrial septostomy and antimicrobial therapy. As the left ventricle was deconditioning rapidly, earlier rather than later surgery was deemed necessary. An uneventful arterial switch operation was performed. The sternum was left open electively due to the significant preoperative tissue edema and the older age for arterial switch operation. The sternum was closed 2 days later uneventfully. The patient remained in the hospital for 4 weeks after surgery to treat postoperative mediastinitis and sepsis that included fungal infection. The patient was discharged home thereafter in good condition.

Disclosure: Authors have nothing to disclose with regard to commercial support.

Received 25 October 2015; revised 27 November 2015; accepted 23 December 2015.

Available online 2 January 2016

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Peer review under responsibility of King Saud University.

URL: www.ksu.edu.sa

<http://dx.doi.org/10.1016/j.jsha.2015.12.004>



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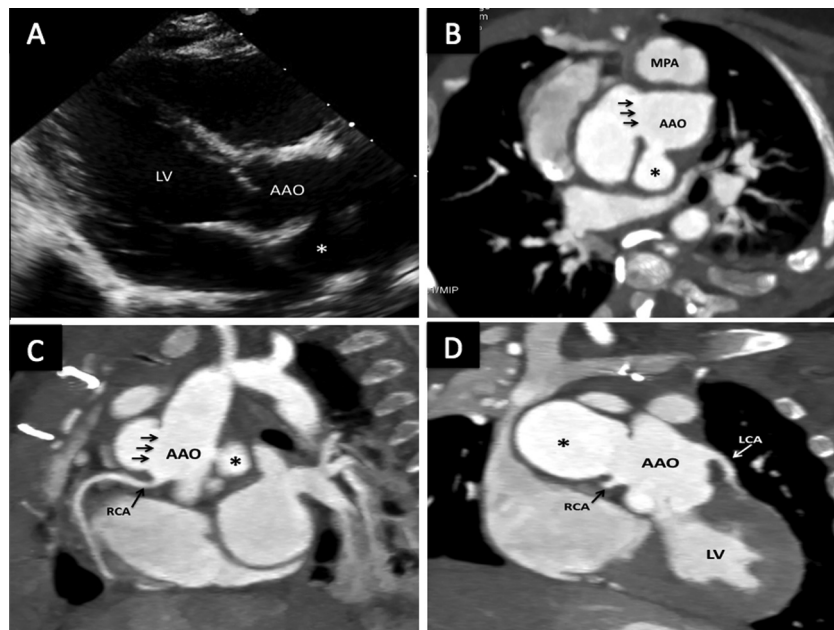


Figure 1. Transthoracic echocardiography and computed tomography (CT) angiography. (A) Transthoracic echocardiography taken at routine follow up 3 months after surgery, parasternal long axis view (*pseudoaneurysm); (B) axial cut of CT angiography (black arrows: the bigger right-sided pseudoaneurysm; *posterior smaller pseudoaneurysm); (C) sagittal cut of CT angiography (black arrows: the bigger right-sided pseudoaneurysm; *posterior smaller pseudoaneurysm); and (D) coronal cut of CT angiography (the bigger right-sided pseudoaneurysm). The CT images (B–D) were performed 3 months after surgery following the echocardiography. AAO = ascending aorta; LCA = left coronary artery; LV = left ventricle; MPA = main pulmonary artery; RCA = right coronary artery.

Three months after surgery, the routine echocardiogram at the outpatient's follow up showed large neo-aortic pseudoaneurysm arising from the right side of the aorta just above the right coronary artery anastomosis. Subsequent computed tomography angiography confirmed the finding of the large pseudoaneurysm in addition to a smaller posterior pseudoaneurysm in the ascending aorta (Figs. 1 and 2).

Urgent surgery was planned and the informed consent was obtained. In the operating room, peripheral cannulation was established via the right common carotid artery and right internal jugular vein. Cardiopulmonary bypass was instituted with systemic cooling to 25 °C. The redo sternotomy was done with extreme caution to avoid getting into the aneurysm, which was large and immediately behind the sternum. Sternotomy was uneventful. Adequate dissection was performed. Cross clamp was applied and antegrade cardioplegia was administered. The main pulmonary artery was transected to aid exposing the aneurysm. Subsequently, the aneurysm was opened. There was a very large false aneurysm arising from the right side of the aorta just above the ostium of the right coronary artery and there was another small aneurysm arising from the posterior aspect of the aorta. Radical excision of the aneurysmal tissue was done. The aorta was

transected from above and below the origin of the aneurysms and direct native aorta to native aorta anastomosis was performed using 6-0 Prolene sutures (Ethicon, Somerville, NJ, USA). Subsequently, the heart was de-aired and the cross clamp was removed. The main pulmonary artery was re-anastomosed. Systemic rewarming was done and cardiopulmonary bypass was weaned off. Postrepair transesophageal echocardiography showed an intact repair with no significant residual lesions and good biventricular function. The patient had an uneventful postoperative course and was discharged home 10 days after surgery in good condition.

At the 3-year follow up, clinical, echocardiographic, and computed tomography angiography showed normal findings (Fig. 3).

Discussion

While pseudoaneurysms have been described after pediatric cardiac surgery particularly when synthetic materials were used [2–4], they have not been described following a primary arterial switch operation. Peculiar effects about this case include late presentation, mechanical ventilation, systemic sepsis with fungal infection, and prolonged prostaglandin administration. In addition, the postoperative course included treatment for

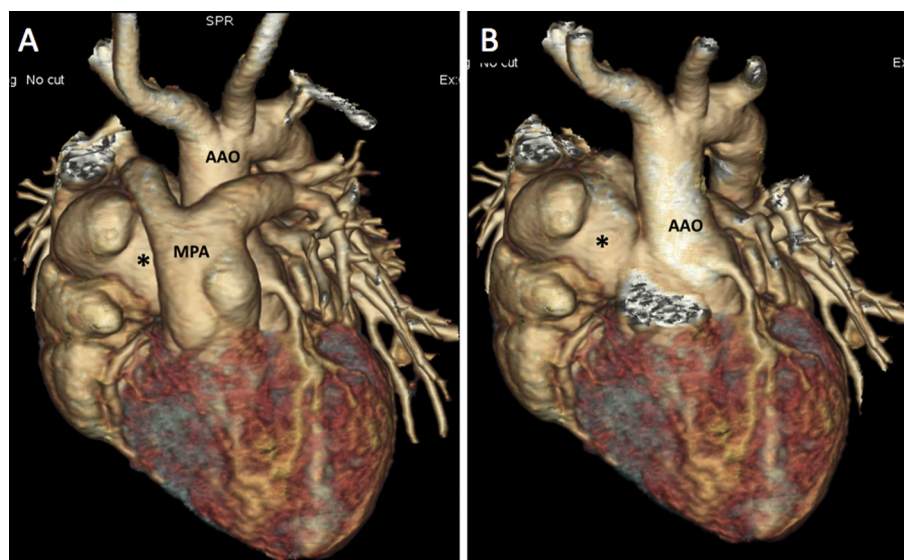


Figure 2. Reconstructed computed tomography image: (A) *neoaortic pseudoaneurysm; (B) main pulmonary artery and branches have been removed from the image to show the anterior aspect of the pseudoaneurysm. A and B are three-dimensional reconstructed images from a previous scan that shows the big pseudoaneurysm at the right side of the aorta. AAO = ascending aorta; MPA = main pulmonary artery.

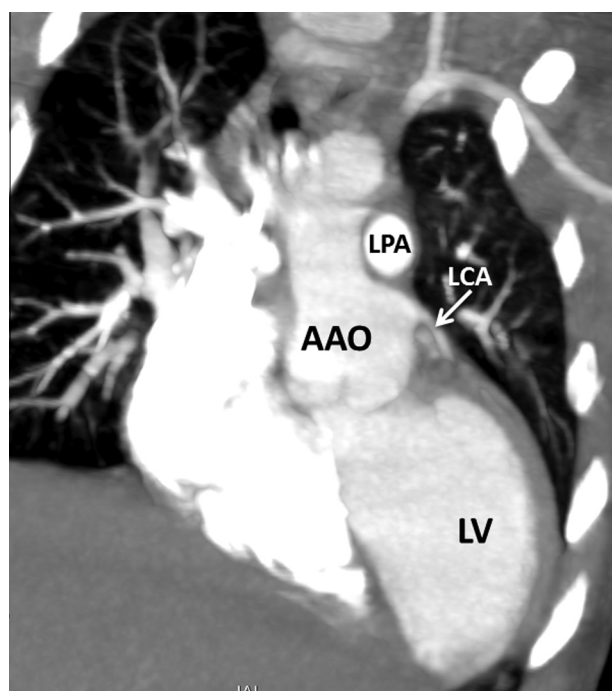


Figure 3. Computed tomography angiography. The image was taken 3 years after the repair of the pseudoaneurysm and shows normal findings. AAO = ascending aorta; LCA = left coronary artery; LPA = left pulmonary artery; LV = left ventricle.

mediastinitis. Considering that arterial switch operation includes numerous suture lines, many of which are exposed to systemic pressure, it is plausible that the pre-existing infection, presence of fungal infection, and postoperative mediastinitis led to weakening of the suture line and development of pseudoaneurysms. Kato et al. [5]

described a case of an infant, nearly 1 years of age, who had staged treatment of transposition of the great arteries with previous pulmonary artery band and a shunt, who developed a pseudoaneurysm attributed to mediastinal infection.

The time was of great essence in our case as the patient was already late presentation (>6 weeks) and a full course of antimicrobial therapy would be at the expense of left ventricular function. That was the reason for deciding to control the sepsis and expedite surgery. However, in cases where timing of surgery is not crucial, it would be the optimal approach to clear the infection radically at first. In addition, in those patients with prolonged antibiotic therapy, fungal infection should be suspected and treated.

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